The Breast Journal

LETTER TO THE EDITOR

The Breast Cancer: a Comparison among Different Diagnostic and Therapeutic Protocols

To the Editor:

Experience gained in years of breast cancer research has given rise to the definition of complex and articulated treatment plans. It is safe to say that nowadays, no modern breast surgery unit can fail to involve more than one specialist in its activities [1]. On the other hand, there is still no single protocol, nor even any consensus among the scientific community on the most appropriate timing of the treatments needed to deal with breast cancer [2].

Every different patient care strategy has its pros and cons. In times when economic resources need to be managed more rationally, there is not just an ethical requirement to fulfill, but also a second important one: the chosen protocol must be as cost-effective as possible.

The breast surgery protocol adopted at the Udine Surgery Department is the result of an effort to extend this same concept, offering patients a treatment plan that limits the number of treatments they receive to a minimum. All breast cancer patients registered at the clinic are studied by performing breast ultrasound, bilateral mammography, and needle biopsy, followed by magnetic resonance imaging (MRI) of the breast. These tests, including the MRI, are conducted for all patients (not just for dubious cases) to enable an accurate diagnosis of the disease and obtain a precise picture of the lesion's extent, so that the most suitable, definitive surgery can be planned (aiming for oncological radicality), thus avoiding any need for any further resurgery.

When sentinel lymph node biopsy (SLNB) during surgery is required, we have recently adopted the one-step nucleic acid amplification (OSNA) method. Finding a positive lymph node leads to a full axillary lymphadenectomy, completed during the same surgical procedure. Here again, this avoids any need to reoperate after obtaining a definitive histology report [3]. OSNA has drastically reduced the time the pathologist needs to examine the sample, indirectly reducing our operating times too [4].

The breast surgery protocol adopted at our Surgery Department differs in two aspects from what is the standard model, because all patients routinely undergo breast MRI, and any SLNB entails an intraoperative histologic examination. The treatment protocol for breast cancer adopted at our clinic closely resembles the approach taken by such an internationally acknowledged organization as the European Institute of Oncology (IEO) in Milan. The only difference between the IEO's protocol and the one adopted in Udine lies in that the IEO also does not conduct an MRI routinely in all cases.

The aim of this study was to compare the three above-described breast surgery protocols from the economic standpoint, calculating their costs when applied to the case series of surgical procedures performed at our Surgery Department in Udine over a 5-year period.

The study considered 767 consecutive patients at the Udine Surgery Department from November 2005 to December 2010. For each patient, we analyzed the available first-level test results and established whether the MRI findings had prompted any changes in the treatment strategy. We considered the type of surgery performed, and particularly any recourse to SLNB. Lymph node positivity would require an axillary lymphadenectomy during the same surgical procedure and we recorded all the cases in which axillary lymphadenectomy was performed.

For the data set thus obtained, each parameter of the breast cancer pathway was associated with the corresponding cost to the health care organization. The various costs were combined for each patient, based on the type of surgery performed and the protocol applied. For each patient, we thus obtained three different costs, i.e., the actual cost and those that would have been incurred for the same patient with the same disease had they been treated according to

Address correspondence and reprint requests to: Federico Cattin, General Surgery Department, University of Udine, P.le Santa Maria della Misericordia 3, Udine 33100, Italy, or e-mail: doctorfef@gmail.com

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the other two protocols. Finally, the calculated total costs per patient using the three different protocols were compared to identify the most cost-effective.

The type of surgery was quadrantectomy in 489 cases (63.7%) and mastectomy in 278 (36.3%). SLNB was performed in 559 cases (72.9%) and the SLN was found positive for disease replication in 90 patients (16.1%). In all cases in which no SLNB was performed, it was because axillary lymphadenectomy was performed in the first instance, generally due to a clinical history or clinical evidence of neoplastic involvement of the axillary structures.

Considering all the economic parameters, routinely performing breast MRI naturally entails a fixed cost coming to bear on all patients, while the economic saving that it generates only concerns a few cases. As the latter saving is much larger, however, the extent of optimization of the financial resources depends on where the breakeven point lies to decide whether or not performing MRI is cost-effective. The same applies to the SLN diagnostics. On the basis of the above considerations, when we combined the costs for each patient, we found that:

- the costs of breast surgery activities at the Surgery Department in Udine in the 5-year period 11/2005–12/2010 amounted to 3,825,890 Euro
- the costs of these same activities during the same period and for the same patients had we followed the protocol adopted by a center of excellence would have amounted to 3,973,722 Euro
- the costs of these same activities during the same period and for the same patients had we used a standard protocol would have been 4,339,588 Euro
- the saving deriving from using our Udine protocol instead of the one adopted at a center of excellence was thus 147,832 Euro;
- the saving deriving from using our protocol instead of the standard protocol amounted to 513,698 Euro.

Finally, comparing the three protocols considered, the breakeven point for the use of breast MRI (referring to the cost of the protocol) was reached as soon as the treatment plan was revised as a consequence in at least 37 cases. The breakeven point was always reached for the intraoperative versus deferred SLN histology: just one case found intraoperatively to have a positive SLN sufficed to make the intraoperative histology economically advantageous.

Based on the findings of our study, the economic savings and organizational benefits of the protocol adopted at our Surgery Department in Udine are considerable. The capital saving can be systematically reassigned to other activities demanding economic resources, to purchase new materials, increase the staff on the payroll, or improve staff training (Table 1).

Table 1. Numerical Example of the Procedures/personnel that Could be Financed with the Savings Deriving from Using the Breast Surgery Protocol Adopted at the Udine Clinic

	Center of excellence	Standard protocol
Breast MRI	458	1590
Hospital stay (days)	259	901
Intraoperative SLN Histology	1320	4676
Deferred SLN Histology	1382	4801
Quart. + SLNB	32	118
Quart. + AL	19	67
Mastectomy + SLNB	26	89
Mastectomy + AL	24	84
Medical staff (1 year)	1	4
Nursing staff (1 year)	4	12
Auxiliary staff (1 year)	5	16

AL, axillary lymphadenectomy.

CONFLICTS OF INTEREST

The authors declare no conflict of interests. No funding source has been asked or obtained to prepare this study.

Federico Cattin, MD*
Luigi Castriotta, MD†
Giulia Zumerle, MD†
Edoardo Scarpa, MD*
Cosimo Alex Leo, MD*
Gloria Semprini, MD‡
Viviana Londero, MD§
Chiara Zuiani, MD§
Carla Di Loreto, PhD¶
Onelio Geatti, MD‖
Massimo Bazzocchi, MD§
Pier Camillo Parodi, PhD‡
Carla Cedolini, MD*
*General Surgery Department
University of Udine
Udine, Italy;
†Hospital General Administration
Azienda Ospedaliero-Universitaria of Udine
Udine, Italy;
‡Plastic and Reconstructive Surgery Department
University of Udine
Udine, Italy;

[§]Diagnostic Radiology Institute
University of Udine
Udine, Italy;
[¶]Pathologic Anatomy Institute
University of Udine
Udine, Italy;
and [‖]Nuclear Medicine Institute
University of Udine
Udine, Italy

REFERENCES

1. Rusby JE, Gough J, Harris PA, MacNeill FA. Oncoplastic multidisciplinary meetings: a necessity or luxury? *Ann R Coll Surg Engl* 2011;93:273–4.

2. Robertson C, Arcot Ragupathy SK, Boachie C, *et al.* The clinical effectiveness and cost-effectiveness of different surveillance mammography regimens after treatment for primary breast cancer: systematic reviews, registry database analyses and economic evaluation. *Health Technol Assess* 2011;15:v–vi, 1–322.

3. Madsen EV, van Dalen J, van Gorp J, van Oort PM, van Dalen T. Frozen section analysis of sentinel lymph nodes in patients with breast cancer does not impair the probability to detect lymph node metastases. *Virchows Arch* 2012;460:69–76.

4. Godey F, Leveque J, Tas P, *et al.* Sentinel lymph node analysis in breast cancer: contribution of one-step nucleic acid amplification (OSNA). *Breast Cancer Res Treat* 2012;131:509–16.